

optics means for concentrating the laser light in a solid angle consistent with the power value of the laser and useful range of the invention;

laser detector means for detecting the an emission of the laser pulse and transferring a signal representative of that information to the said drive electronics;

signal receiver means including analog circuitry for collecting reflected electromagnetic signals from said objects and developing three-dimensional object data sampling and capturing all or a protion of the laser pulse shape;

output electronics means for conditioning and transferring said data;

data processor means for receiving said conditioned data, storing the data, computing parameters indicative of potential collisions from said data, deciding the likelihood of potential collisions from said parameters and sending control signals to the drive electronics and said operator communications system;

drive electronics means for controlling the timing and biasing of said signal transmitter, said signal receiver and the said output electronics.

2-14. (Canceled)

15. (Amended) The device for warning the operator of a stationary or moving vehicle of potential collisions with objects in his physical environment of claims 1, 2, ~~3~~, 4, ~~11~~, ~~12~~ and ~~13~~, wherein the said circuit means for developing data indicative of the flight time of a laser pulse to a portion of an object and back to the device includes analog, pulse-shape-sampling circuitry.

16. (Amended) The device for warning the operator of a stationary or moving vehicle of potential collisions with objects in his physical environment of claims 1, 2, ~~3~~,

~~4, 11, 12 and 13~~, wherein the said circuit means for developing data indicative of the flight time of a laser pulse to a portion of an object and back to the device includes Schmitt Trigger circuitry.

17. (Amended) The device for warning the operator of a stationary or moving vehicle of potential collisions with objects in his physical environment of claims 1, ~~2, 3, 4, 11, 12 and 13~~, wherein the said circuit means for developing data indicative of the flight time of a laser pulse to a portion of an object and back to the device includes Transimpedance Amplifier circuitry.

18-20 (Canceled).

21. (Original) The device for warning the operator of a stationary or moving vehicle of potential collisions with objects in his physical environment of claim 1 wherein said output electronics means includes analog to digital converters.

22. (Original) The device for warning the operator of a stationary or moving vehicle of potential collisions with objects in his physical environment of claim 1 wherein said output electronics means includes gain and offset correction circuitry.

23. (Original) The device for warning the operator of a stationary or moving vehicle of potential collisions with objects in his physical environment of claim 1 wherein said output electronics means includes circuitry for implementing range calculations using said data.

24. (Amended) The device for warning the operator of a stationary or moving vehicle of potential collisions with objects in his physical environment of claims ~~1 and 23~~ wherein said output electronics means includes circuitry for implementing time of impact calculations.

25. (Amended) The device for warning the operator of a stationary or moving vehicle of potential collisions with objects in his physical environment of claim ~~1, 23 and~~ 24 wherein said output electronics means includes circuitry for implementing collision avoidance decisions.

26. (Original) The device for warning the operator of a stationary or moving vehicle of potential collisions with objects in his physical environment of claim 1 wherein said data processor means includes a digital computer.

27. (Original) The device for warning the operator of a stationary or moving vehicle of potential collisions with objects in his physical environment of claim 1 wherein said data processor means includes range computation software.

28. (Original) The device for warning the operator of a stationary or moving vehicle of potential collisions with objects in his physical environment of claim 1 wherein said data processor means includes time-of-impact computation software.

29. (Original) The device for warning the operator of a stationary or moving vehicle of potential collisions with objects in his physical environment of claim 1 wherein said data processor means includes object recognition software.

30. (Amended) The device for warning the operator of a stationary or moving vehicle of potential collisions with objects in his physical environment of claims ~~1 and~~ 29 wherein said object recognition software is three-dimensional object recognition software.

31. (Original) The device for warning the operator of a stationary or moving vehicle of potential collisions with objects in his physical environment of claim 1 wherein said data processor means includes collision-avoidance calculation software.

32. (Original) The device for warning the operator of a stationary or moving vehicle of potential collisions with objects in his physical environment of claim 1 wherein said data processor means includes minimum-damage calculation software.

33-36. (Canceled)

37. (Amended) The device for warning the operator of a stationary or moving vehicle of potential collisions with objects in his physical environment of claims 1 and ~~34~~ wherein said environmental sensor system means includes a coefficient of friction indicator.

38-48 (Canceled).

49. (Amended) The device for warning the operator of a stationary or moving vehicle of potential collisions with objects in his physical environment of claims 1 and ~~48~~ wherein said signal receiver can process Doppler-shifted laser signals.

50. (Original) The device for warning the operator of a stationary or moving vehicle of potential collisions with objects in his physical environment of claim 1 wherein said electromagnetic signal is a microwave signal.

51-53. (Canceled)

54.(Original) A method for warning the operator of a stationary or moving vehicle of potential collisions with objects in his physical environment, where the environment may include obscuration, comprising the steps of:

generating a series of pulses of light;

transmitting said light into said environment;

collecting light from said environment during the time of transmission and

reflection of said light from said objects;

providing electrical signals from a plurality of positions on the objects with a single light pulse,

storing said electrical signals on a plurality of unit cells corresponding to the said plurality of positions on said objects,

providing signals from ~~said~~ storage means,

converting the signals stored on said storage means to three dimensional images of the objects;

processing said images to calculate the likelihood of object collisions with said vehicle;

communicating the results of said calculation to the vehicle operator

55. (Original) The method for warning the operator of a stationary or moving vehicle of potential collisions with objects in his physical environment of claim 54, wherein the electrical signals correspond to the transit time of the light to the object positions and back to the transmitter.

56. (Original) The method for warning the operator of a stationary or moving vehicle of potential collisions with objects in his physical environment of claim 54, wherein the said processing includes calculation of collision avoidance maneuvers.

57. (Amended) The method for warning the operator of a stationary or moving vehicle of potential collisions with objects in his physical environment of ~~claims 54 and~~ 56, wherein the said communication includes communication of collision avoidance maneuvers.

58. (Original) The method for warning the operator of a stationary or moving vehicle of potential collisions with objects in his physical environment of claim 54,

wherein the said processing includes calculation of minimum-damage maneuvers.

59. (Amended) The method for warning the operator of a stationary or moving vehicle of potential collisions with objects in his physical environment of claims ~~54~~ and 58, wherein the said communication includes communication of minimum-damage maneuvers.